

## **REMARKS**

The claims have been amended to more particularly claim that which the applicants regard as the invention. There has been no introduction of new matter. Withdrawn claims 21-25 have been cancelled.

### **Election Requirement**

The Examiner has made the previously made election requirement final. On page 2, 3<sup>rd</sup> paragraph, the Examiner has indicated that Claims 21-25 have been withdrawn from consideration. On page 1, item 4a), the Examiner has indicated that Claims 2, 4-7, 10-13 and 21-25 have been withdrawn.

Clarification of the identity of the withdrawn claims is respectfully requested.

### **Rejections –35 U.S.C. 112, 1<sup>st</sup> Paragraph**

Claim 1 has been rejected under 35 U.S.C. 112, first paragraph, because the specification allegedly does not reasonably provide enablement. The Examiner has alleged that no enablement is provided for “essentially no fugitive” constituent will deposit and precipitate upon the residue.”

Claim 1 has also been rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement. The Examiner has alleged that, “essentially no fugitive constituent will deposit and precipitate” is new matter.

Claim 1 has been amended and it is believed that this rejection is no longer applicable. The Examiner is respectfully requested to reconsider and withdraw this rejection.

Rejection – 35 U.S.C. 112, 2<sup>nd</sup> Paragraph

Claims 1, 3, have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 3 have been amended, and it is believed that this rejection is no longer applicable to the amended claims. The Examiner is respectfully requested to reconsider and withdraw this rejection.

Rejection – 35 U.S.C. 103(a) – Burgard '275

Claims 1, 8, 14 have been rejected under 35 U.S.C. 103(a) as being unpatentable over WO 96/34829 or Burgard '275.

Both of these references will be considered as the same reference for purposes of this discussion since, as noted by the Examiner, Burgard '275 appears to be the English equivalent of WO 96/34829. Reference herein will be to the Burgard '275.

Burgard '275 discloses a method in which a suspension is formed of nanosized particles in a solvent that has no solvent or only a low solvent capability for the particles and in the presence of a surface-blocking substance. Afterwards the suspension is subjected to conditions that lead to a densification and/or crystallization of the nanosize particles. The function of the surface-blocking agent is to suppress uncontrolled particle growth. (See col. 5, lines 45-46). The crystallization and/or densification may be carried out directly in the suspension. (See col. 5, lines 57 to 62.) Thus, the Burgard '275, for purposes of comparing it with the present invention, is a chemical precipitation process wherein the particles are formed by precipitating materials from a solution.

This contrasts with the present invention, where the material that ultimately forms the nanosize particles is formed into a solid composite or mixed solid, i.e. a “precursor ceramic material comprising a fugitive constituent and a non-soluble constituent in a single phase” as recited in Claim 1. Unlike Burgard ‘275, the nanosize particles are not grown, but formed by removing the fugitive material. This is accomplished by decomposing or removing the fugitive material by subjecting the mixed solid to a solvent that selectively removes the fugitive material. The non-soluble constituent does not dissolve or react with the solvent and is left behind. With removal of the surrounding fugitive constituent the non-soluble material exists as a nanosize powder with minimal agglomeration.

The Burgard ‘275 is fundamentally a different process from the present invention, and does not render the present claims obvious. The Burgard ‘275 does not disclose or suggest the formation of a precursor ceramic material comprising a fugitive constituent and a non-soluble constituent in a single phase. In the present process, there is no crystallization and no densification as disclosed in Burgard ‘275. Burgard ‘275 does not disclose or suggest decomposing the fugitive constituent to leave the non-soluble constituent. Burgard ‘275 does not disclose or suggest contacting the precursor material with a selective solvent to form a solution of the fugitive constituent in the solvent and a non-dissolved residue of the non-soluble constituent. Further, Burgard ‘275 does not disclose or suggest removing a solution of the fugitive constituent from the residue to form a nanosize powder of the residue of the non-soluble constituent.

It is believed that the present invention as claimed is patentable over the Burgard ‘275 reference. The present invention includes steps that are not disclosed and are not suggested by

Burgard '275. The Examiner is respectfully requested to reconsider and withdraw the present rejection.

Rejection – 35 U.S.C. 103(a) – Recasens '310

Claims 1, 8, 14 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Recasens '310.

In the method disclosed in Recasens '310 a non-crystallized pulverulent white solid of metazironic acid is made. The solid is formed by preparing a water rich zirconia hydrate or zirconium oxide, optionally replacing some of the OH- ions with halide ions, and partially dehydrating by heating until the pulverulent white solid is obtained. This water rich zirconia hydrate may be formed by neutralization of an acidic solution, or hydrolysis of an organic zirconium salt in water or water/alcohol, or displacement of ions from a solid basic Zr salt with a reactant in aqueous solution.

Referring specifically to Example I, which was referred to by the Examiner, zirconia is mixed with NaOH, and the mixture is heated to form a solid mixture of sodium zirconate and excess sodium hydroxide. This mixture is contacted with water to obtain a suspension. The suspension is filtered and the residue washed with water, HCl, and water. The paste that is formed is then dehydrated to form the pulverulent product. In this example, the sodium zirconate is subjected to displacement of ions from the sodium zirconate by water. (See col. 3, lines 4 to 11.)

This method differs from the present invention in several respects. Firstly, it is not disclosed or suggested by the disclosure of Recasens '310, that the product is a nanosize powder. It is described as “not crystallized”, “pulverulent,” “dry in appearance” and “soluble in aqueous

solutions of an acid". There is no teaching or suggestion that the material described exists as nanosized particles. Note that the starting material is a microsized zirconia (0.6 to 15  $\mu\text{m}$ ), which is three magnitudes larger in particle size than the nanosize powders of the invention.

In addition, the precursor of the Recasens '310 powder undergoes a chemical transformation from a solid basic salt of sodium to a  $\text{ZrO}_2$  solid that is free of Na (less than 0.5% impurities). In Recasens '310 there is no fugitive constituent that is soluble in a solvent, as in the present invention. There is also no precursor material that includes a non-soluble material that is "insoluble in the solvent such that there is essentially no precursor material and non-soluble residue in the solution that will deposit and precipitate upon the residue of the non-soluble-constituent" as in Claim 1. To the contrary, the initial sodium zirconate basic salt is changed by a displacement reaction. This differs from the present invention in which a fugitive material is removed leaving a residue of non-reactive, non-soluble material

Furthermore, the product in Recasens '310 is reactive in a solvent used in the method of manufacture. The reactive derivatives are reactive in hydrochloric acid (col. 4, line 1), which was also used to displace the residual sodium (col. 3, lines 39 to 41). This differs from the present invention where the non-soluble material is not reactive in the solution through which the fugitive material is removed.

For the above reasons, the Applicants do not believe that the present claims are unpatentable over the Recasens '310 reference. Accordingly, the Examiner is respectfully requested to reconsider and withdraw this rejection.

### Objections

Claims 9, 15-20 have been objected as being dependent on a rejected base claim.


The base claims of these claims have been amended and the rejection of these claims is believed to have been overcome. Claim 15 has been amended to independent form. The Examiner is respectfully requested to reconsider and withdraw this objection.

Summary

The applicant believes the present claims to be allowable under 35 U.S.C. §112, first and second paragraphs, and 35 U.S.C. §103. Accordingly, the Examiner is respectfully requested to allow the present claims.

Respectfully submitted;

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James L. Sonntag  
Reg. No. 30,224